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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,771	03/24/2004	Gopal B. Avinash	142427	2770
23413	7590	12/12/2007		
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			EXAMINER VANCHY JR, MICHAEL J	
			ART UNIT 2624	PAPER NUMBER
			MAIL DATE 12/12/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	Application No. 10/708,771	Applicant(s) AVINASH ET AL.	
	Examiner Michael Vanchy Jr.	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 26 September 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 13-27 and 30-33 is/are rejected.
- 7) ☒ Claim(s) 7-12 and 28-29 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments, see pages 10-17, filed September 26, 2007, with respect to the rejection(s) of claim(s) 1-30 under 35 U.S.C 102 and 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Hong et al. and Vafai.

### ***Claim Rejections - 35 USC § 101***

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 10 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. A program which operates a computer is merely a set of instructions capable of being implemented by a computer. However, by itself without being encoded onto a computer-readable medium is not realizable. See MPEP 2106: IV(B)(1)(a), last paragraph.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**2. Claims 1-6, 13-16, 18-27, and 31-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Hong et al., 2002/0037103 A1.**

**Regarding claim 1:**

A method for processing a digital image, the method comprising: estimating a foreground region relating to an imaged object; estimating a background region relating to other than the imaged object; and by using the image, the estimated foreground region and the estimated background region, calculating a transition region disposed between the foreground region and the background region; wherein the estimated foreground region, the estimated background region, and the calculated transition region, each comprise a separate set of pixels that may each be processed separately for suppressing pixel intensities in the estimated background region and improving image quality ([0068] and [0086-0088]).

**Regarding claim 2:**

The method of claim 1, wherein: the estimating a foreground region comprises defining an initial foreground region as that region containing those pixels of the image meeting a first criterion; and the estimating a background region comprises defining the background region as that region containing those pixels of the image meeting a second criterion; and the transition region is calculated by a gradient constrained hysteresis threshold method (Figs. 1, 2 and [0086-0087]).

**Regarding claim 3:**

The method of claim 2, wherein the first criterion comprises a pixel intensity greater than a first threshold ([0087]).

**Regarding claim 4:**

The method of claim 2, wherein the second criterion comprises a pixel intensity less than a second threshold ([0086]).

**Regarding claim 5:**

The method of claim 2, wherein the calculating a transition region comprises calculating the transition region as that region containing those pixels of the image meeting a third criterion ([0088]).

**Regarding claim 6:**

The method of claim 5, wherein the third criterion comprises: a pixel having a pixel intensity greater than the second threshold ([0087]), a morphological connection to a foreground pixel, and a gradient magnitude that is within a gradient tolerance value of the gradient magnitude of the foreground pixel ([0020]).

**Regarding claim 13:**

The method of claim 5, further comprising: defining an object region as the union of the initial foreground region and the initial transition region, and performing at least one morphological operation on the object region ([0020]).

**Regarding claim 14:**

The method of claim 13, further comprising: defining a final foreground mask as the initial foreground region; defining a final transition mask as the difference between the object region and the final foreground region; and defining a final background mask as the remainder of the image ([0086-0088]).

**Regarding claim 15:**

The method of claim 14, further comprising: suppressing pixel intensities in the background region by gradually reducing the intensity of background pixels to zero as a function of their distance from the object region ([0020]).

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**Regarding claim 16:**

The method of claim 15, wherein the function comprises a linear ramp function, an exponential function, a Gaussian function, a Hanning function, a Hamming function, any function for reducing a value with respect to distance, or any combination of functions comprising at least one of the foregoing functions ([0020]).

**Regarding claim 18**, see rejection made to claim 1, as it addresses the rejection to the method of this computer program.

**Regarding claim 19**, see rejection made to claim 2, as it addresses the rejection to the method of this computer program.

**Regarding claim 20**, see rejection made to claim 3, as it addresses the rejection to the method of this computer program.

**Regarding claim 21**, see rejection made to claim 4, as it addresses the rejection to the method of this computer program.

**Regarding claim 22**, see rejection made to claim 5, as it addresses the rejection to the method of this computer program.

**Regarding claim 23**, see rejection made to claim 6, as it addresses the rejection to the method of this computer program.

**Regarding claim 24**, see rejection made to claim 13, as it addresses the rejection to the method of this computer program.

**Regarding claim 25**, see rejection made to claim 14, as it addresses the rejection to the method of this computer program.

**Regarding claim 26**, see rejection made to claim 15, as it addresses the rejection to the method of this computer program.

**Regarding claim 27**, see rejection made to claim 16, as it addresses the rejection to the method of this computer program.

**Regarding claim 31**, see rejections made to claims 1-5, as they address the limitations made within claim 31.

**Regarding claim 32:**

The method of claim 31, wherein: the first threshold is a percentage of the mean intensity of the non-zero pixels in the image ([0059]).

**Regarding claim 33:**

The method of claim 32 wherein: the inputs to said gradient constrained hysteresis threshold method is a gradient magnitude image and said estimated foreground image (Figs. 1 and 2, and [0087]).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. **Claims 17 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hong et al., 2002/0037103 A1, and further in view of Vafai, 5,825,910.**

Regarding claim 17, Hong teaches using image segmentation but is silent on using them for x-ray imaging, however Vafai does (col. 2, lines 20-21). It would be clear to one of ordinary skill in the art at the time of the invention to implement Hong's segmentation on images from an x-ray as done in Vafai, since it is still a digital image which Hong's segmentation can handle.

***Allowable Subject Matter***

6. Claims 7-12 and 28-29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Examiner's Note***

The referenced citations made in the rejection(s) above are intended to exemplify areas in the prior art document(s) in which the examiner believed are the most relevant to the claimed subject matter. However, it is incumbent upon the applicant to analyze the prior art document(s) in its/their entirety since other areas of the document(s) may be relied upon at a later time to substantiate examiner's rationale of record. A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. W.L. Gore & associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).



However, "the prior art's mere disclosure of more than one alternative does not constitute a teaching away from any of these alternatives because such disclosure does not criticize, discredit, or otherwise discourage the solution claimed...." In re Fulton, 391 F.3d 1195, 1201, 73 USPQ2d 1141, 1146 (Fed. Cir. 2004).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Vanchy Jr. whose telephone number is (571) 270-1193. The examiner can normally be reached on Monday - Friday 8:30 am - 5:00 pm.

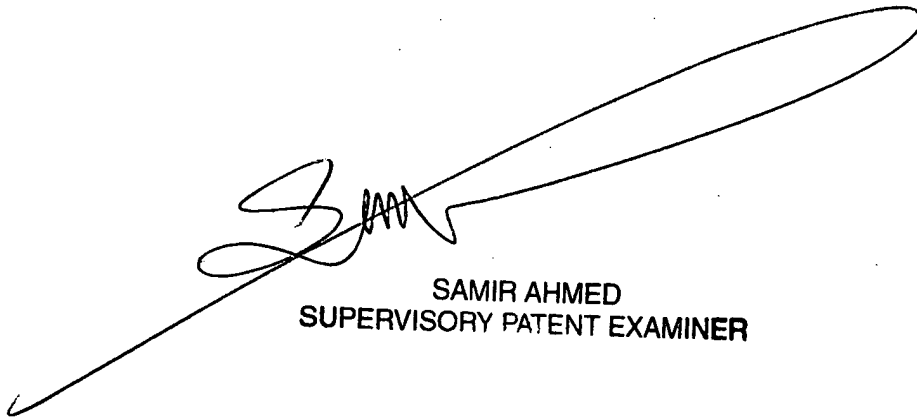
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on (571) 272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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A handwritten signature in black ink, appearing to read 'SAMIR AHMED', is written over the printed name and title. The signature is stylized with a large, sweeping loop that extends upwards and to the right.

**SAMIR AHMED**  
**SUPERVISORY PATENT EXAMINER**